*Journal of Caring Sciences, 2014*, 3(3), 185-192
doi:10.5681/jcs.2014.020
http:// journals.tbzmed.ac.ir/ JCS

# The Impact of Multimedia Education on Knowledge and Self-efficacy among Parents of Children with Asthma: A Randomized Clinical Trial

**Ahmad Reza Zarei[1]*, Faezeh Jahanpour[1], Fatemeh Alhani[2], Najmeh Razazan[1], Afshin Ostovar[3]**

[1]*Departement of Nursing, Faculty of Nursing & Midwifery, Bushehr University of Medical Sciences, Bushehr, Iran*
[2]*Departement of Nursing, Faculty of Medicine, Tarbiat Modares University, Tehran, Iran*
[3]*Departement of Epidemiology, Persian Gulf Tropical Medicine Research Center, Bushehr University of Medical Sciences, Bushehr, Iran*

**ARTICLE INFO**

***Article Type:***
Original Article

***Article History:***
Received: 9 Feb. 2014
Accepted: 8 Jun. 2014
ePublished: 1 Sep. 2014

***Keywords:***
Asthma
Knowledge
Self efficacy
Multimedia
Parents

**ABSTRACT**

***Introduction:*** Asthma is one of the most common chronic diseases among children, and is considered as a global health problem. According to the guidelines of childhood Asthma, parental education in order to improve their knowledge and self-efficacy should be considered in clinical care. Therefore, this study was performed with the purpose of investigating the influence of multimedia education on knowledge and self-efficacy among parents of children with Asthma.

***Methods:*** This study is a clinical trial which was carried out on 50 parents of children with Asthma. Three instruments, i.e. demographic information, assessing knowledge and self-efficacy among parents of children were administrated to collect the required data sets. Reliability and validity of the instruments were assessed and the multimedia education was carried out for the experimental group. Data analysis was done using SPSS 13 and descriptive inferential statistical tests (independent t-test and Mann-Whitney).

***Results:*** History of Asthma was present in majority 52% among families of the children and 54% reported smoking in their home. The average scores of knowledge and self-efficacy in the experimental group showed an increase after multimedia education methods, so that there was a statistically significant difference between the experimental and control groups.

***Conclusion:*** The results obtained in this study also demonstrate that educating parents through multimedia technology increase their knowledge and self–efficacy in their care of children.

## Introduction

In the recent decade, the aspects of health regarding the cause of disease and death have changed by the advances in science and technology and changes in lifestyle. In this regard, chronic and metabol diseases have been replaced with infectious disease.[1]

Currently, chronic diseases are the leading cause of health problems in developed countries and in all age groups, different social-economic classes and cultures emerge.[2] diseases among children. Increased morbidity and mortality from this disease has increased public health concern.[3] Despite scientific and technological advances in the treatment of Asthma, 260 thousand people lose their lives due to this illness every year. Over 5 million children and adolescents are the victims of Asthma.[4] International studies indicate that the prevalence of children Asthma all over the world including Asian countries is rising.[5] According to the statistics 3-35% (300 million) people worldwide have Asthma,[6] which may be increased to 100 million people since 2025.[7]

The prevalence of Asthma symptoms in children in the middle east has changed from

*** Corresponding Author:** Ahmad Reza Zarei (MSc), E-mail: ahmad.zarei99@yahoo.com.
This research is registered in the Iranian Registry of Clinical Trials with the IRCT2013031712830N1

7.5% in Morocco to 17% in Kuwait and average-frequency in the area ranges from 10.7.[8] In the second report the Strategic Committee of the International plan of Asthma and allergies in 2004, the prevalence of Asthma among children in Iran was estimated 13.2 which confirms the annual increase.[9]

Asthma is the most common chronic disease of childhood and is the primary admission at emergency centers[10] and one of the most common causes of hospitalization of children in hospital in the developed countries.[11] Absence from school occurs in 42-47% of children with Asthma form more than 10 days per year the major reason of which is the frequent visits and hospitalizations, which may cause a significant burden on patients, their families and society.[3] Also their parents have several days of lost work with and the disease have higher costs than other health care expenses.[12]

Parents as the child's primary caregivers are responsible for many aspects of their care including signs, drugs prescription and transferring to medical centers,[13] therefore, nursing interventions for children with Asthma in addition to themselves must include their families in taking better care of the child care. Ways of helping individuals and families to get an active role in their health care must emphasize empowering more than helping.[14] People are empowered when they have the necessary information about the disease.[15] On the other hand treating children with Asthma is not only limited to medication therapy and resistance against allergens, but more important is the role of education. The training also includes children and their parents to be able to bring Asthma under control[16] and this goal is achieved when the patient and family are adequately trained about the disease and have access to high quality health care.[17]

Education is the foundation of the management of this disease.[18] The results of some studies confirm that parents are the most important aspects of the treatment of Asthma and Asthma management practices. According to the guidelines of childhood Asthma, parental education in order to improve the knowledge associated with Asthma should be considered in routine clinical care. On the other hand research indicates that parents' knowledge in relation to their child's Asthma is at a low level that more researches should be done in order to promote educational programs related to Asthma for parents. Improving parents' knowledge and their attitudes can encourage parents to monitor their children's Asthma status, better management and adherence to treatment regimens. Education level can influence the ability of parents to gain knowledge and higher levels of parental knowledge regarding their child's Asthma can provide better care.[3] Continued poor results in the treatment of child Asthma has caused various educational interventions to improve care and the need to provide innovative approaches to improve Asthma care is increasingly felt.[19] According to social learning theory, knowledge and skills obtained in simulated situations have the ability to transfer to real-life situations.[20]

Multimedia education as a new educational methods is performed by conveying the concepts and educational materials in an easier, more wide and attractive along with text, sound, pictures and video[4] and has a special capacity and potential to convey information for patients and especially those with low literacy.[21] This new education program can facilitate decision-making process by empowering patients for having an active role in selecting health-oriented programs[22] and if it is along with proper design will be highly effective in transferring data.[20] Childhood Asthma affects the entire family members, and nursing interventions and education should also involve family members. Therefore, this study was conducted to assess the influence of multimedia education on knowledge and self-efficacy in parents of children with Asthma.

 

## Materials and methods

This study is a clinical trial that was conducted on parents of children with Asthma in Bushehr, Iran. The required sample size for the Alpha 0.05 and test power of 80% for a standard deviation of 10, to detect 8 score difference between the two groups was calculated to be 50 patients (25 patients per group). The study population included all parents of children less than 12 years of old with Asthma, and sampling was firstly conducted in available form and then simply randomly was divided into two groups of experimental and control. The inclusion criteria included: parents of children with Asthma (boy and girl) less than 12 years, confirming the child's Asthma by a doctor (from at least 3 months before), having no special mental illness, the ability and willingness of parents to participate in completing the questionnaire. Exclusion criteria included: membership of the parents in health team and their participation in similar studies.

The instruments used in this study included demographic information questionnaire containing 15 questions about the child and parents (gender, age, birth order of the child with Asthma, duration of Asthma, severity of illness of the child, family history of Asthma, history of smoking in family members, place of residence, parent education, parent occupation and etc.) which was completed by the parents, the questionnaire of knowledge assessment included 10 multiple-choice questions and the questionnaire of parents self-efficacy about Asthma consists of 12 questions with 5 scores where the choice completely agree has the highest score and the choice completely disagree gets the lowest score. The reliability of the questionnaires used in this study consisted of a questionnaire for assessing parents through test-retest (r=0.86) and the questionnaire of parents' self-efficacy in a study conducted by Teymouri et al., on children with Asthma has been confirmed by Cronbach's alpha (α=0.86).[14] Again, the validity of the instruments in this study were assessed through content validity in a way that these instruments were given to ten faculty members and specialists of Asthma and allergies and their comments were analyzed for increased funding. The reliability of the instruments was also assessed through Cronbach's alpha (α=0.92) and was approved for this study.

This study was conducted in three stages:

A) The stage of before intervention:

After receiving an approval from the Department of Bushehr University of Medical Sciences, the participants were selected using availability method and then randomly assigned to either the experimental group or control group, respectively. Since the city of Bushehr did not have an allergy and Asthma clinic in the sampling period, referring to local sampling (Asthma & Allergy Specialist and doctors' offices) after getting acquainted with their parents, they were invited to participate in the study, and after the presence of parents, the researcher introduced himself and stated the objectives of the study and its importance and how the research is going to be done, then they signed an informed written consent from about how to intervene and how to complete the questionnaire and to ensure the confidentiality of data and information. Then the pretest was performed. The experimental group received the treatment and control group did not receive any treatment.

B) The stage of intervention

In this study multimedia education was used to achieve the objectives of this study.

Self-made CD includes two key steps to increase knowledge and self-efficacy was about the information on the path physiology of the disease, physiology, treatment, symptoms and home environmental allergens, nutrition, and the proper use of the spray.

Then the CD was handed Asthma and Allergy specialists assess its' validity and their ideas were studied and after approval

by the Asthma and Allergy specialists was edited by one the faculty members of the School of Nursing and Midwifery of Bushehr. Because this study was designed to test and control, the treatment phase lasted for a month just for experimental group and the control group received no treatment.

First step increasing knowledge: to improve the knowledge of training sessions Multimedia Education (CD) was used. In a way that individually and separately for each of the participants a single session for about thirty minutes was held. On the first session in addition to train how to use the software, learning topics 1- physiology, symptoms, complications, prognosis, 2- predisposing factors for Asthma attacks, 3- medical treatment, were taught using multimedia software (CD-ROM). At the end of the session several video questions were raised to determine how much parents have learnt the material.

The second step promoting self-efficacy: to promote the self-efficacy another session was held for 30 minutes. In a way that each of the required skills was explained, and then the skill was taught through the software. For example, parents were trained via software about how to avoid allergens in the home environment, adequate nutrition, activities and sports for children, how to properly use Asthma spray. Also on the CD-ROM a blatant animation was designed to properly show how to use Asthma spray step by step (Like shaking the inhaler, taking the cap, deep breathing, putting the mouthpiece between the lips and rounding the lips around the mouthpiece, doing a deep breath and slowly press the spray cylinder, keeping your breath a period of 10 seconds) for parents, so that they can monitor the proper use of the spray by children and be self-efficacy in this issue. At the end of the session several video questions were raised to determine to what extent parents are familiar with the content. Then at the end of this step and after ensuring about the ability of parents to properly using the software, CD was handed to them so that they take it home and their private place and study further.

C) The stage of after intervention (Evaluation):

To assess the consequences, one month after the last session of training using multimedia and ending the treatment period, again, the parents were given questionnaires to be completed, using the responses to the questionnaires, the change rate of parents' knowledge and self-efficacy was achieved after the intervention in comparison to before the intervention. Data were analyzed using statistical SPSS Ver. 13 software. In this study the descriptive statistics used includes frequency, percent of frequency, mean and standard deviation. Normally distributed variables were evaluated by Kolmogorov-Smirnov test, and based on that the knowledge scores were compared using Mann-Whitney test (due to non-normal distribution) and t-test was used to measure parents self-efficacy.

## Results

The mean (SD) of disease background of children in the treatment group was 3.36 (0.81) and the control group 3.36 (1.15) years old. 72% of the children on the basis of intensity of the disease were on intermediate stage and 28% were on mild stage. And the highest percentage 48% had developing Asthma background for three years and more. Most of the families of children had background of Asthma 52% and 54% reported tobacco smoking in their home.

Table 1 shows demographic characteristics of the subjects in both experimental and control groups. Table 2 shows Parental knowledge scores in the experimental and control groups before and after the treatment. Based on the test results based on nonparametric Mann - Whitney test there is a significant difference after the intervention between two groups ($P<0.001$). Also in Table 2 there is a significant difference between

 

**Table 1.** Frequency of demographic data of samples

| Characteristics | Frequency (percent of frequency) Experimental N (%) | Control N (%) | P |
|---|---|---|---|
| **Father's education** | | | |
| Less than diploma | 5 (20) | 4 (16) | 0.87 |
| Diploma | 12 (48) | 9 (36) | |
| University educated | 8 (32) | 12 (48) | |
| **Mother's education** | | | |
| Less than diploma | 7 (28) | 7 (28) | 1 |
| Diploma | 6 (24) | 6 (24) | |
| University educated | 12 (48) | 12 (48) | |
| **Father's occupation** | | | |
| Unemployed | 0 (0) | 1 (4) | 0.84 |
| Worker | 3 (12) | 4 (16) | |
| Self-employed | 12 (48) | 9 (36) | |
| Employee | 9 (36) | 9 (36) | |
| Other | 1 (4) | 2 (8) | |
| **Mother's occupation** | | | |
| Housewife | 22 (88) | 24 (96) | 0.3 |
| Employee | 3 (12) | 1 (4) | |

**Table 2.** Comparing the knowledge and self-efficacy scores of parents before and after training using multimedia between the experimental and control groups

| Component | Experimental | | Control | | P* |
|---|---|---|---|---|---|
| | Before intervention Mean (SD) | After intervention Mean (SD) | Before intervention Mean (SD) | After intervention Mean (SD) | |
| Knowledge | 5.12 (1.94) | 8.72 (0.97) | 5.12 (1.96) | 5.96 (1.59) | P<0.001 |
| Self-efficacy | 35.72 (11.1) | 52.68 (3.55) | 39.56 (10.57) | 37.40 (6.82) | P<0.001 |

*In this table P is the difference between before and after in the experimental and control groups.

experimental and control groups according to the results of the test based on t-test P<0.001).

## Discussion

According to the results of the study, the demographic variables in both experimental and control groups were similar and had no significant difference. The results of this study indicated that there was a significant difference between the mean score of parent's knowledge before and after the treatment, so that parent training using multimedia increased the knowledge of parents in the experimental group after training. Educating parents about their child's condition includes teaching the required new skills, recommending and providing support, has been recognized as a strategy for empowering parents.[23] But the results of the studies suggest that parents knowledge associated with Asthma for children is in a low level so that they often have very little information about the occurrence of clinical Asthma, attacks and causes.[3] In a study by Sharif et al., which was conducted in order to investigate knowledge, attitude and self-efficacy in patients with Asthma, the findings indicated that knowledge of patients suffering Asthma is very low and only 7.5% of patients had knowledge about their illness.[24] Since the

children are dependent on their parents and sometimes have the responsibility to give their children's drugs, their little knowledge can lead to non-adherence to medication.[11] Some studies argue that educating parents of children with Asthma is important aspect in the treatment of children to improve management practices[3] and the use of educational interventions, such as multimedia can provide more information with greater detail than other traditional cares for patients and caregivers.[22] For example, in a study which was conducted by Krishna et al.,[12] on children with Asthma they concluded that multimedia education programs can increase the knowledge of parents and children in order to control and prevent Asthma attacks.[12]

However, the results of this study and other studies emphasize the multimedia education in teaching children with Asthma and their families, especially for parents who are directly involved with their children's illness that can prepare new opportunities to increase knowledge and provide them with the resources and lower costs.

The results of this study showed that there is a significant difference between the mean score of parental self-efficacy before and after the treatment. So that parent training using multimedia increased parental self-efficacy in the treatment group after the training. Self-efficacy was a very important issue in Asthma self-management.[25]

The aim of self-efficacy about Asthma is having self-confidence to precisely interpret the disease and its' symptoms following appropriate care program[26] and in our study self-efficacy is contributed to empowerment of parents in order to identify the types of allergens in the home environment, train and supervise the correct use of inhaler for children, food choices, right exercise and medication regimen for their sick child. The results of the present study showed that the use of multimedia in teaching parents can improve their efficacy about Asthma in their child. The results of studies show that low levels of self-efficacy are associated with hospital admissions.[26] But on the other hand, using modern techniques such as multimedia in education can contribute to the promotion of self-efficacy and performance.[27] Also the results of the study of Masoodi et al., on caregivers of patients with multiple sclerosis showed that training the caregivers of patients with MS, increases knowledge, understanding and skills and assists them in caring and leads to the improved functional role.[28] Also in a study conducted by Homer it was shown that computer-based training programs improve and enhance the performance and behavior of Asthma patients, that this issue is effective in reducing their visits to clinics.[29] However, the results of the present study showed that training parents of children with Asthma using multimedia approach improves their knowledge and self-efficacy about their child's sickness.

## Conclusion

Special attention should be paid to training parents in relation to their children who are suffering from chronic diseases such as Asthma, in the country. According to the results of this study, the use of modern methods of instruction, including the technology of Multimedia education has promoted knowledge and self-efficacy of parents of children with Asthma in the child's disease management, therefore, due to the effectiveness and simplicity of multimedia education along with fun for children and parents, the use of it to improve the other results of other chronic diseases of childhood is not recommended in broader level.

Due to the lack of allergy and Asthma clinic at the time of sampling in Bushehr and selecting the available clinical sample, the number of samples might not represent the entire population of a society; therefore it is suggested to selected samples from the whole community so that the results of the study could be more generalizable.

 

## Acknowledgments

This article is supported by the Deputy of Research at Bushehr University of Medical Sciences.

Thereby the researcher acknowledges their gratitude to the Deputy of Research and also all the parents who helped this research to be conducted.

## Ethical issues

None to be declared.

## Conflict of interest

The authors declare no conflict of interest in this study.

## References

1. Rafii F, Soleimani M, Naiemeh SF. A model of patient participation with chronic disease in nursing care. Koomesh 2011;12 (3): 293 - 304. (Persian)
2. Shasti S, Mirhaghjou SN, Masouleh SR, Emami Sigarodi A. Study the Life Skills of 11-19 year old Children affected by Thalassemia referring to Educational and Remedial Centers in Rasht city from their Mothers' Point of View 2009-2010. Jornal of Nursing and Midwifery Faculty, Gilan University 2011;20 (63): 16-21. (Persian)
3. Zhao J, Shen K, Xiang L, Zhang G, Xie M, Bai J, et al. The knowledge, attitudes and practices of parents of children with Asthma in 29 cities of China: a multi-center study. BMC Pediatrics 2013; 13 (20): 1-6.
4. Aghvamy M, Mohammadzadeh S, Gallalmanesh M, Zare R. Assessment the education compariment to two ways: groupe education and computer education on quality of life in the children 8-12 years suffering from Asthma in the valiasr hospital of Zanjan. Zanjan University of Medical Sciences Journal 2010; 19 (74): 78-85. (Persian)
5. Vichyanond P, Pensrichon R, Kurasirikul S. Progress in the management of childhood Asthma. Asia Pac Allergy 2012; 2 (1): 15-25.
6. Ferri FF. Ferri's clinical advisor. Ferri FF, editor. London: Mosby Elsevier; 2009.
7. Bousquet J. Global surveillance, prevention and control of chronic respiratory diseases: a comprehensive approach. Khaltaev N, editor. Switzerland: World Health Organization; 2007.
8. Heidarnia MA, Entezari A, Moein M, Mehrabi Y, Pourpak Z. Prevalence of Asthma symptom in Iran: a meta-analysis. Pejouhesh 2007; 31 (3): 217-25. (Persian)
9. Asher MI, Montefort S, Bjorksten B, Lai CKW, Strachan DP, Weiland SK, et al. Worldwide time trends in the prevalence of symptoms of Asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. Lancet 2006; 368 (9537): 733-43.
10. Krishna S, Francisco BD, Balas EA, Konig P. Effective and sustainable multimedia education for children with Asthma: a randomized controlled trial. Children's Health Care 2006; 35 (1): 75–90.
11. Schultz A, Marti AC .Outpatient Management of Asthma in Children. Clinical Medicine Insights: Pediatrics 2013; 7:13-24.
12. Krishna S, Francisco B, Balas A. Internet-enabled interactive multimedia Asthma Education program: a randomized trial. Pediatrics 2003; 111 (3): 503-10.
13. Cerdan NS, Alpert PT, Moonie S, Cyrkiel D, Rue S. Asthma severity in children and the quality of life of their parents. Applied Nursing Research 2012; 25 (3): 131-7.
14. Teymouri F, Alhani F, Kazemnejad A. The effect of family-centered empowerment model on the quality of life of school-age Asthma children.

Nursing Research 2011; 6 (20): 52-63. (Persian)
15. Tol A, Alhani F, Shojaeazadeh D, Sharifirad G. Empowerment approach to promote quality of life and self-management among type 2 diabetic patients. Journal of Health Researches 2011; 7 (2): 157-68. (Persian)
16. Cheng YF, Hsu LN. outcomes of continuing education in the care of children with Asthma for pediatric healthcare providers. The Journal of Continuing Education in Nursing 2007; 38(3): 122-31.
17. Wang J Y, Liu L F. Health care utilization and medical costs for childhood Asthma in Taiwan: using Taiwan national health insurance research database. Asia Pac Allergy 2012; 2 (3): 167-71.
18. Garcinuno AC, Vazquez CD, Uruena IC , Crespo MP, Vinoly AG, Guerra IG. Group education on Asthma for children and caregivers: a randomized, controlled trial addressing effects on morbidity and quality of life. J Investig Allergol Clin Immunol 2007; 17(4): 216-26.
19. Yee AB, Halterman JS. Improving pediatric Asthma care: a familiar question and the search for new answers. Academic Pediatrics 2012; 12 (4): 255-6.
20. Homer C, Susskind O, Alpert HR, Owusu MS, Schneider L. An evaluation of an innovative multimedia educational software program for Asthma management: report of a randomized, controlled trial. Pediatrics 2000; 106 **(**1 Pt 2): 210-5.
21. Wilson E, Makoul G, Bojarski EA, Bailey SC, Waite KR, Rapp DN, et al. Comparative analysis of print and multimedia health materials: a review of the literature Patient Educ Couns 2012; 89 (1): 7-14.
22. Jeste D, Dunn L, Folsom DP, Zisook D. Multimedia educational aids for improving consumer knowledge about illness management and treatment decisions: a reviewof randomized controlled trials. J Psychiatr Res 2008; 42 (1): 1-21.
23. Panicker L. Nurses' perceptions of parent empowerment in chronic illness. Contemp Nurse 2013; 45 (2): 210-9.
24. Sharif L, Pourpak Z, Heidarnazhad H, Bokaie S, Moin M. Asthma Knowledge, Attitude, and Self-Efcacy in Iranian Asthmatic Patients. Archives of Iranian Medicine 2011; 14 (5): 315-20.
25. Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of educational interventions for self management of Asthma in children and adolescents: systematic review and meta-analysis. BMJ 2003; 326 (7402): 1308-09.
26. Mancuso CA, Sayles W, Allegrante JP. Knowledge, attitude and self-efficacy in Asthma self- management and quality of life. J Asthma 2010; 47 (8): 883-8.
27. Yeh ML, Chen HH, Liu PH. Effects of multimedia with printed nursing guide in education on self-efficacy and functional activity and hospitalization in patients with hip replacement. Patient Educ Couns 2005; 57 (2): 217-24.
28. Masoodi R, Alhani F, Moghadassi J, Ghorbani M. The effect of family-centered empowerment model on skill, attitude, and knowledge of multiple sclerosis caregivers. Journal of Birjand University of Medical Sciences 2010; 17 (2): 87-97. (Persian)
29. Homer C, Susskind O, Alpert HR, Owusu C, Schneider L. An evaluation of an innovative multimedia educational software program for Asthma management: report of a randomized, controlled trial. Pediatrics 2000; 106: 210-5.

 